IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re U.S. Patent Application of: Guenther H. Ruhe
Examiner: WANG, Ben C
U.S Application No.: 10/807,465
Filing Date: March 24, 2004
Confirmation No.: 2920
Art Unit: 2192
Title: Release planning
Attorney Docket No.: 473-1US

APPEAL BRIEF FILED UNDER 37 CFR 41.37

M.S. Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TO THE COMMISSIONER FOR PATENTS:

This Appeal Brief is filed in support of the Notice of Appeal filed July 15, 2010, appealing the Examiner's final rejection dated January 22, 2010, of pending Claims 1-2, 8-10, 13-16, 18 and 21-28 under 35 U.S.C. 103(a) as being unpatentable over Robin et al. (Pub. No. US 2005/0114829 A1) in view of Aurum et al. (*The fundamental Nature of Requirements Engineering Activities as a Decision-Making Process*, November 1 2003, Elsevier, pp. 945-954) and Hartman (*A Self-Adapting Genetic Algorithm for project Scheduling under Resource Constraints*, 2002 by John Wiley & Sons, Inc.).

The applicant requests an extension of time of three months to file the appeal brief. The fee is submitted herewith.

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(i). <u>REAL PARTY IN INTEREST</u>

The Assignee, Guenther H. Ruhe, is the real party in interest, by way of an assignment executed on June 13, 2007.

(ii). <u>RELATED APPEALS AND INTERFERENCES</u>

None.

(iii). <u>STATUS OF CLAIMS</u>

Claims 3-7, 11-12, 17 and 19-20 have been cancelled. Claims 1-2, 8-10, 13-16, 18 and 21-28 have been finally rejected, and it is these rejections that are being appealed.

(iv). <u>STATUS OF AMENDMENTS</u>

No amendments to the application have been filed subsequent to the final rejection of January 22, 2010.

(v). SUMMARY OF CLAIMED SUBJECT MATTER

Of the claims at issue, claims 1, 21, 22 are independent claims. Claims 2, 8-10, 13-16, 18 and 23-28 depend directly or indirectly from claim 1. In the summary below, page and line numbers refer to the specification as filed.

Claim 1 refers to a method of release planning. Stakeholder priorities are assigned (step 106, page 12, lines 15-20; page 18 line 1 - page 21 line 17) to a set of requirements, where the priorities are assigned by plural stakeholders. A set of constraints on the requirements is explicitly defined (step 104, page 12, line 15; page 13 line 22 – page 17 line 30). A set of release plan solutions is generated using algorithms carried out by a computer (steps 108 and 110, page 12, lines 20-26; page 24 line 20 – page 27 line 29; page 30 line 26 – page 33, line 27) for evaluation together (step 112, page 12, lines 26-27; page 28 line 1 – page 30 line 24), each release plan solution of the set of release plan solutions satisfying the constraints (page 12, lines 21-22), balancing between stakeholder priorities of different stakeholders (para 68), and having a positive impact (page 12, lines 25-26), measured by objective criteria (page 21 line 29 – page 22 line 18), on at least one of project time, overall cost and quality (page 12, lines 25-26).

Claim 2 refers to the step of generating (step 108) being carried out repeatedly after changing (step 116) one or more of the constraints, requirements, objective criteria, or stakeholder priorities (page 13 lines 1-5).

Claim 21 refers to a computer programmed to carry out the method of claim 1 (page 10 lines 12-13).

Claim 22 refers to computer readable media containing instructions for a computer to carry out the method of claim 1 (page 10 lines 13-14).

(vi). <u>GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL</u>

Claims 1-2, 8-10, 13-16, 18 and 21-28 currently stand rejected under 35 U.S.C. 103(a). In view of this rejection, the issue presented for review on appeal is as follows:

Issue: Whether Claims 1-2, 8-10, 13-16, 18 and 21-28 are unpatentable over Robin et al. (Pub. No. US 2005/0114829 A1) in view of Aurum et al. (The fundamental Nature of Requirements Engineering Activities as a Decision-Making Process, November 1 2003, Elsevier, pp. 945-954) and Hartman (A Self-Adapting Genetic Algorithm for project Scheduling under Resource Constraints, 2002 by John Wiley & Sons, Inc.)

(vii). <u>ARGUMENT</u>

This is an appeal to the Board of Patent Appeals and Interferences from the office action dated January 22, 2010. In the detailed action, the examiner rejected Claims 1-2, 8-10, 13-16, 18 and 21-28 under 35 U.S.C. 103(a).

Under 35 U.S.C. 103(a), a rejection of the claims generally must meet four key elements as set out by the Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), and summarized in the *Manual of Patent Examining Procedure (MPEP) Edition 8 (E8), August, 2001, Latest Revision July 2010*, s. 2141. These elements are as follows:

(A) Determining the scope and contents of the prior art;

(B) Ascertaining the differences between the prior art and the claims in issue;

(C) Resolving the level of ordinary skill in the pertinent art; and

(D) Evaluating evidence of secondary considerations.

The applicant submits that the examiner has failed to determine correctly the scope and contents of the prior art and also to assess properly the differences between the references and the claimed invention.

The applicant further submits that the Examiner incorrectly combined the cited references to support the obviousness rejection. The Supreme Court decision in *KSR Int'l Co. Inc. v. Teleflex Inc.* 550. U.S. 550 U.S. 398 (2007) has rejected a strict adherence to the teaching, suggestion and motivation test. However, the court also affirmed that "[a] patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art" (at II(B)) and that there must still be some motivation to combine the references.

Robin teaches the use of data structures to facilitate the process of designing and developing a software project. Robin discloses planning to do multiple releases, but does not disclose release planning in the sense of producing a set of candidate assignments of features to

increments. Robin also teaches a method of risk management including prioritizing risks to enable the team to commit project resources to manage the most important risks (para 1127). In the context of a process model Robin briefly mentions that each stakeholder will have requirements or features that are important to them, and that responsibilities of the product management role include identifying the important stakeholders of the project, taking their needs into account, and managing stakeholder relationships. However, Robin does not disclose further how to deal with each stakeholder having requirements or features that are important to them.

Aurum examines the elements of organization-oriented macro decisions as well as process-oriented micro decisions in the RE (requirements engineering) process and illustrates how to integrate classical decision-making models with RE process models.

Hartman teaches a genetic algorithm for solving the resource-constrained project scheduling problem.

1.   Rejection under U.S.C. 103(a) over Robin in view of Aurum and Hartman

    a. Claims 1, 2, 8-10, 13-16, 18 and 21-28

    (A)   Ascertaining the differences between the claimed invention and the references

Claim 1 requires assigning stakeholder priorities to a set of requirements, where the priorities are assigned by plural stakeholders, explicitly defining a set of constraints on the requirements, and generating a set of release plan solutions using algorithms carried out by a computer for evaluation together.

The examiner cites Robin as disclosing assigning stakeholder priorities to a set of requirements and generating a set of release plan solutions. Although the examiner admits that Robin does not teach generating a set of release plan solutions carried out by a computer, the

examiner cites paragraph [357], where Robin mentions creating a multi-release plan, as disclosing generating a set of release plan solutions, but the statement in paragraph [357] carries no content. The other parts of Robin do not teach what to do with this multi-release plan. Robin does not disclose generating a set of release plan solutions for evaluation together.

Although the examiner cited Fig. 5, step 2, "Analyze & Prioritize" as disclosing assigning stakeholder priorities to a set of requirements, this is part of a risk analysis and is not directly a prioritization of requirements. Further, Robin does not disclose prioritizing risks according to stakeholder priorities, but at most discloses the risk prioritization as being accountable to stakeholders (paragraph [1209]). Robin refers in vague terms to stakeholders having different priorities, but does not say what to do about the differences in priorities beyond that their needs should be taken into account and that they should align their decisions and priorities with a broader team purpose. Robin does not disclose assigning stakeholder priorities to a set of requirements.

Although the examiner does not cite Robin as disclosing explicitly defining a set of constraints on the requirements, for completeness it is noted that while Robin refers repeatedly to constraints, there is no place in Robin where there is an actual teaching of "defining a set of constraints on the requirements". Nothing in Robin says what to do with the constraints referred to. The constraints are observed to be a general part of the overall problem, but are never explicitly defined and are not defined on the requirements.

The examiner turns to Aurum for a teaching of explicitly defining a set of constraints on the requirements. For that paper, two former papers (dated 1965 and 1976) are considered and their relevance for the requirements engineering process is discussed (on macro respectively micro level). Section 4.1.2 of Aurum simply notes that one must consider requirements and costs and benefits of alternatives, but says nothing about explicitly defining a set of constraints on the requirements. "[C]larifying an initial set of fuzzy requirements" (s. 4.1.2.) or "a more detailed analysis of the requirements" (s.3.2) may simply refer to coming up with more detailed

requirements, and is not disclosed as referring to placing constraints on the requirements. "[A]ssessment of the relative costs and benefits of each alternative" (s. 4.1.2) and "evaluating the costs and benefits of alternative solutions and negotiations" do not without more define a set of constraints on the requirements. Aurum does not disclose explicitly defining a set of constraints on the requirements. Nor does Aurum disclose assigning stakeholder priorities to a set of requirements, where the priorities are assigned by plural stakeholders; and generating a set of release plan solutions using algorithms carried out by a computer for evaluation together.

Further, Aurum teaches nothing about the release plan problem. Aurum examines the elements of organization-oriented macro decisions as well as process-oriented micro decisions in the RE (requirements engineering) process and illustrates how to integrate classical decision-making models with RE process models. This integration helps in formulating a common vocabulary and model to improve the manageability of the RE process, and contributes towards the learning process by validating and verifying the consistency of decision-making in RE activities.

In their Conclusions, Aurum states that

"A question that arises from the new understanding of RE decisions is 'how can we best manage the RE activities as a decision-making process?' The complexity of the activities involved in the RE process call for a need for organizations to coordinate the decision-making process and make the decisions and the roles played with respect to decision-making in RE more visible."

This clearly indicates that the authors do not see their contribution is a concrete solution method, neither for RE in general, nor for release planning in particular.

All Aurum does is discuss certain issues in RE, but provides no solution. Providing an operational and repeatable method to solve the very concrete problem of release planning is a

completely different issue, and is not addressed or intended by the authors.

The examiner turns to Hartman for teaching generating a set of release plan solutions using algorithms carried out by a computer. The applicant submits:

First, Hartman does not deal with release plan solutions. Hartman applies algorithms to the classical resource-constrained project scheduling problem (RCPSP), and produces a schedule for an individual to follow. Hence, linking the step of generating a set of release plan solutions using algorithms carried out by a computer to the release plan problem is a link only made by the applicant.

While the examiner conceded that Hartman fails to teach generating multiple solutions for evaluation together (and therefore cited Aurum), the applicant also submits that Hartman is irrelevant for teaching nothing useful about generating release plan solutions. Since the examiner has re-iterated that Hartman discloses generating a set of release plan solutions, and finds the applicant's argument non-persuasive on the point, the applicant now deals with this statement in more detail.

(1) The problem (called A) addressed by Hartmann is the resource-constrained project scheduling problem (RCPSP) which can be stated as follows: A single project consists of a number of n activities where each activity has to be processed in order to complete the project. The activities are interrelated by two kinds of constraints.

First, precedence constraints force activity j not to be started before all its immediate predecessors have been finished. Second, performing the activities requires resources with limited capacities.

Altogether there is a set of R resources. While being processed, activity j requires $r(j,k)$ units of resource k from R in every time instant of its non-preemptable duration $P(j)$. Resource k has a

limited capacity of R(k) at any point in time. The parameters p(j), r(j,k), and R(k) are assumed to be non-negative and deterministic.

The objective of the RCPSP is to find precedence and resource feasible completion times for all activities such that the make-span of the project is minimized.

This problem was initially stated in 1969 by A. Pritsker, L. Watters, P. Wolfe, Multiproject scheduling with limited resources: A zero-one programming approach, Management Science 16 (1969) 93-107.

What Hartmann has contributed is a specialized (genetic) solution algorithm for this problem.

(2) The problem (called B) addressed by the applicant is completely different (Claim 1). The applicant seeks to generate more than one release plan, namely a set of release plan solutions. From this set of release plan solutions, a release plan solution may be selected.

(3) The two problems A (solved by Hartman) and B (solved by the applicant) are not related.

1.   A looks at tasks for scheduling, B looks for features (referred to as requirements in the claim) packed into releases. Features (requirements) are not the same as tasks. Features are a matter of operational planning.
2.   The objective of A is to minimize make-span, the objective of B is to maximize value gained from the packages (each release plan solution having a positive impact, measured by objective criteria, on at least one of project time, overall cost and quality).
3.   A is looking for one schedule of tasks, B is looking for a set of release plan solutions, which are candidates for the finally selected solution.
4.   A has no consideration of stakeholder priorities at all, while B assigns stakeholder priorities to a set of requirements and balances between stakeholder priorities of different stakeholders.

Therefore, Hartman does not disclose anything related to the method of claim 1 because the paper does not talk at all about the process of release planning.

The main contribution of the Hartman paper is a special implementation of a genetic algorithm and its application to the classical resource-constrained project scheduling problem (RCPSP). Hartmann proposed a new heuristic called self-adapting genetic algorithm to solve the RCPSP. "The heuristic employs the well-known activity list representation and considers two different decoding procedures. An additional gene in the representation determines which of the two decoding procedures is actually used to compute a schedule for an individual. This allows the genetic algorithm to adapt itself to the problem instance actually solved".

Moreover, Hartman produces a single schedule, and does not teach generating anything let alone a set of release plan solutions … for evaluation together. In fact, in neither Robin nor Hartman is there a consideration of generating multiple solutions for evaluation together. The combination of references therefore fails to yield the invention.

(B)   <u>Resolving the level of ordinary skill in the pertinent art</u>

Applicant submits that the person of ordinary skill in the art is a computer engineer with 3-5 years working in a human resources department.

(C)   <u>Determination of whether the claimed invention would have been obvious to one of ordinary skill in the art</u>

It would not have been obvious to one of ordinary skill in the art, at the time of the invention was made, to combine the teachings of Hartman, Robin and Aurum, fundamentally because none of the three has papers has looked into a method for release planning. To state that three papers not addressing release planning at all and vaguely related to each other would allow

to provide a concrete method for release planning is neither objective nor constructive.

Robin mentions creating a multi-release plan, as disclosing generating a set of release plan solutions, but the statement in paragraph [357] carries no content. The other parts of Robin do not teach what to do with this multi-release plan. Robin does not disclose generating a set of release plan solutions for evaluation together.

Aurum teaches nothing about the release plan problem. Aurum examines the elements of organization-oriented macro decisions as well as process-oriented micro decisions in the RE (requirements engineering) process and illustrates how to integrate classical decision-making models with RE process models. This integration helps in formulating a common vocabulary and model to improve the manageability of the RE process, and contributes towards the learning process by validating and verifying the consistency of decision-making in RE activities.

All Aurum does is discuss certain issues in RE, but provides no solution. Providing an operational and repeatable method to solve the very concrete problem of release planning is a completely different issue, and is not addressed or intended by the authors.

Hartman applies algorithms to the classical resource-constrained project scheduling problem (RCPSP), and produces a schedule for an individual to follow. Hence, linking the step of generating a set of release plan solutions using algorithms carried out by a computer to the release plan problem is a link only made by the applicant.

Hartman is irrelevant for teaching nothing useful about generating release plan solutions.

The problem addressed by the applicant is completely different (Claim 1). The applicant seeks to generate more than one release plan, namely a set of release plan solutions. From this set of release plan solutions, a release plan solution may be selected.

The problems solved by Hartman and the problem solved by the applicant are not related. In neither Robin nor Hartman is there a consideration of generating multiple solutions for evaluation together. The combination of references therefore fails to yield the invention.

The remaining claims all depend on claim 1 and are therefore allowable over the cited references. All claims are therefore submitted to be patentable over the cited references.

  b. Claim 2

Claim 2 adds to claim 1 that the generating is carried out repeatedly after changing one or more of the constraints, requirements, objective criteria, or stakeholder priorities.

In Robin, any generating that takes place (and it's not the kind of generating the applicant carries out) is done to a single plan, not a set of solutions. Neither Aurum nor Hartman teach generating release plan solutions as argued above in relation to claim 1.

Conclusion

For at least the reasons discussed above, it is submitted that the Applicant's invention as defined by the claims is unobvious in view of the combination of references presented in each rejection. It is therefore submitted that the claims on appeal are in condition for allowance, and that the rejection should be reversed. Action to that end is respectfully requested.

(viii). CLAIM APPENDIX

1.   A method of release planning, the method comprising:

        assigning stakeholder priorities to a set of requirements, where the priorities are assigned by plural stakeholders;

        explicitly defining a set of constraints on the requirements; and

generating a set of release plan solutions using algorithms carried out by a computer for evaluation together, each release plan solution of the set of release plan solutions satisfying the constraints, balancing between stakeholder priorities of different stakeholders, and having a positive impact, measured by objective criteria, on at least one of project time, overall cost and quality.

2.   The method of claim 1 in which generating is carried out repeatedly after changing one or more of the constraints, requirements, objective criteria, or stakeholder priorities.

3-7.   (Cancelled)

8.   The method of claim 2 in which changing comprises actions chosen from a group consisting of:

        adding additional requirements;

        removing existing requirements;

        modifying existing requirements; and

        adjusting stakeholder priorities.

9.   The method of claim 2 further comprising assigning the requirements to one of the next release, the next but one release, or unassigned.

10.   The method of claim 9 in which repeating the generation of a set of release plan solutions comprises using the unassigned requirements as the requirements in the next generation of a set of release plan solutions.

11–12. (Cancelled)

13.   The method of claim 1 in which the set of constraints is chosen from a group consisting of precedence relationships between requirements, coupling relationships between requirements, effort, resource, budget, risk, and time.

14.   The method of claim 1 in which stakeholder priorities are represented by a numerical value representing stakeholder satisfaction that a requirement be assigned to one of three categories, the categories consisting of the next release, the next but one release, and postponed.

15.   The method of claim 1 in which the requirements are grouped into groups of requirements and the algorithms balance between stakeholder priorities assigned to the groups of requirements.

16.   The method of claim 1 in which stakeholders prioritize subsets of the complete set of requirements.

17.   (Cancelled)

18.   The method of claim 1 where the set of release plan solutions generated are a set of maximally distinct alternative release plan solutions where for each plan the guaranteed degree of optimality is known.

19-20. (Cancelled)

21.   A computer programmed to carry out the method of claim 1.

22.   Computer readable media containing instructions for a computer to carry out the method

of claim 1.

23.   The method of claim 1 in which the constraints comprise a measure of resource consumption.

24.   The method of claim 1 further comprising selecting at least one release plan solution from the set of candidate release plan solutions based on the positive impact of the at least one release plan solution.

25.   The method of claim 24 in which the algorithms comprise one or more of genetic algorithms, heuristic algorithms and integer programming algorithms.

26.   The method of claim 25 in which the algorithms use at least one objective function to evaluate release plan solutions.

27.   The method of claim 26 in which the objective function comprises an aggregation of stakeholder priorities or value estimates.

28.   The method of claim 27 in which computation of the algorithms is carried out externally from an application service provider, and stakeholder priorities are input to the computer from remote   locations.
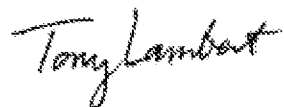
(ix). <u>EVIDENCE APPENDIX</u>

None.

(x). <u>RELATED PROCEEDINGS APPENDIX</u>

None.

Respectfully submitted

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